Journal of Infection 86 (2023) e49–e50

Contents lists available at ScienceDirect

Journal of Infection

journal homepage: www.elsevier.com/locate/jinf

Letter to the Editor

A booster shot of vaccine against SARS-CoV-2 should be rigorously promoted and implemented in China

Dear Editor,

We read with great interest the study by Yin et al.,[1] which reported that patients with inactivated vaccine boosters (Sinovac) have protective antibody against the Omicron variant. Three types of vaccines including inactivated vaccine (Sinovac and Sinopharm), adenovirus vector vaccine (CanSinoBIO) and protein subunit vaccine (Zifivax) against SARS-CoV-2 were authorized and widely used in China. However, the SARS-CoV-2 Omicron BA.2 variant breakthrough infections have emerged in many vaccine recipients in Shanghai, China.[2] What is more, the effects of previous vaccine regimes on the incidence of mild or asymptomatic infections with SARS-CoV-2 Omicron BA.2 variant were unknow. This study aimed to evaluate the effectiveness of the previous vaccine regimes on the incidence of mild and asymptomatic infections with SARS-CoV-2 Omicron BA.2 variant.

All infections with SARS-CoV-2 Omicron BA.2 were diagnosed by frequent large scale viral nucleic acid screenings in Shanghai. One shot of adenovirus vector vaccine (CanSinoBIO), two shots of inactivated vaccine (Sinovac and Sinopharm) and three shots of protein subunit vaccine (Zifivax) were regarded as the full vaccination.

The number of people in different age groups in Shanghai were got from past census data and their vaccination coverage was retrieved from the report of Shanghai Municipal Health Commission. The percentages of asymptomatic and mild confirmed cases with different vaccination status in this city were approximately estimated by the 233,067 patients with SARS-CoV-2 infection who had no symptoms or mild symptoms recruited from 3 major Fangcang shelter hospitals. The risk ratio (RR) and 95% confidence intervals (CIs) were calculated to assess the effectiveness of the vaccine regimes on the incidence of Omicron BA.2 infection. All statistical analyses were performed using R software 4.1.0 and SPSS Statistics 25.0.

More than 70% children and adult had received full vaccination, but only 54.70% adult and 37.50% elderly people had received booster vaccination (**Table 1**). As of June 23, 2022, there were 591,518 asymptomatic patients and those with mild symptoms in Shanghai, and adults accounted for the highest proportion of all patients. The proportion of the asymptomatic patients and those with mild symptoms with different vaccination status were shown in Table 1. Our results showed that previous full vaccination contributed to the decreased incidence of mild and asymptomatic Omicron BA.2 infections in children (RR, 0.49; 95%CI, 0.48–0.51) and the elderly people (RR, 0.91; 95%CI, 0.89–0.92). The incidence of Omicron BA.2 infections was significantly lower in adults (RR, 0.91; 95%CI, 0.91–0.92) and the elderly people (RR, 0.79; 95%CI, 0.78–0.80) with a booster shot of previous vaccine regimes compared with the unvaccinated population.

Table 1
The risk ratio of Omicron variant infection by age.

	3~17 years old	18~59 years old	≥60 years old
Number of population (n)	2,347,920	16,193,080	5,815,600
Full coverage (%)	71.02%	77.40%	63.16%
Booster coverage (%)	0%	54.70%	37.50%
Total infection (n)	29,535	486,441	75,542
Infection with full vaccination (%)	61.07%	31.36%	25.82%
Infection with booster vaccination (%)	0%	46.45%	34.59%
RR (95%CI)			
Full vaccination (without booster)	0.49 (0.48–0.51)	1.27 (1.26–1.28)	0.91 (0.89–0.92)
Booster vaccination	–	0.91 (0.91–0.92)	0.79 (0.78–0.80)

RR: risk ratio; 95%CI: 95% confidence intervals.

To the best of our knowledge, this is the first study examining the effectiveness of previous vaccine regimes against asymptomatic and mild Omicron BA.2 infections in Shanghai. Our results show significantly beneficial effects of previous vaccine regimes in China on reducing the incidence of the asymptomatic and mild Omicron BA.2 infections.

One study showed the significant effectiveness of previous inactivated vaccine on mortality, hospital or intensive care unit admissions of patients with Omicron infections in China.[3] Another study suggested that the neutralizing antibody induced by the booster vaccination of protein subunit vaccine (Zifivax) and inactivated vaccine (Sinovac) had a protective effect on the infection of Omicron BA.2 in vitro.[4] Our study shows that the effectiveness of previous full vaccination was limited in adults. It may be due to the earlier vaccination in adults leading to a decrease in vaccine efficacy. Limitations of the study include the lacking of detailed data for different types of vaccines in this city.

In conclusion, a booster shot of vaccine against SARS-CoV-2 should be rigorously promoted and implemented in China.

Contributors

YY, JL and SY conceptualized and designed the study, collected data, carried out the initial analyses, drafted the initial manuscript. ST coordinated and supervised data collection, assisted in the statistical analysis and revised the manuscript. EC, JZ, and WW conceptualized and designed the study, supervised data collection, reviewed and revised the manuscript. All authors critically reviewed the manuscript. All authors had full access to all the data in the study and had final responsibility for the decision to submit for publication.

https://doi.org/10.1016/j.jinf.2022.09.015

Ethical approval

The study was approved by the ethics committee of the Shanghai Children's Medical Center and conducted according to the Declaration of Helsinki guidelines. The requirement of obtaining informed consent was waived because this study was conducted retrospectively, and all patients' information was handled anonymously.

Data availability statement

The deidentified individual participant dataset used in this article will be made available with publication upon reasonable request.

Funding

This study did not receive any funding.

Declaration of Competing Interests

There is no conflict of interests.

References

1. Yin Y, Li X, Qian C, Cheng B, Lu F, Shen T. Antibody efficacy of inactivated vaccine boosters (CoronaVac) against Omicron variant from a 15-month follow-up study. *J Infect* 2022;**85**(4):e119–21.
2. Zhang X, Zhang W, Chen S. Shanghai's life-saving efforts against the current omicron wave of the COVID-19 pandemic. *Lancet* 2022;**399**(10340):2011–12.
3. Zheng H, Cao Y, Chen X, et al. Disease profile and plasma neutralizing activity of post-vaccination Omicron BA.1 infection in Tianjin, China: a retrospective study. *Cell Res* 2022;**32**(8):781–4.
4. Zhao X, Zhang R, Qiao S, et al. Omicron SARS-CoV-2 neutralization from inactivated and ZF2001 vaccines. *N Engl J Med* 2022;**387**(3):277–80.

Yong Yin[1], Jilei Lin[1]
Department of Respiratory Medicine, Shanghai Children's Medical Center, School of Medicine, Shanghai Jiaotong University, Shanghai, China
Pediatric AI Clinical Application and Research Center, Shanghai Children's Medical Center, Shanghai, China
Shanghai Engineering Research Center of Intelligence Pediatrics (SERCIP), Shanghai, China

Shuhua Yuan[1]
Department of Respiratory Medicine, Shanghai Children's Medical Center, School of Medicine, Shanghai Jiaotong University, Shanghai, China

Shilu Tong
Department of Clinical Epidemiology and Biostatistics, Shanghai Children's Medical Center National Children's Medical Center, School of Medicine, Shanghai Jiaotong University, Shanghai, China
School of Public Health, Institute of Environment and Population Health, Anhui Medical University, Hefei, China
Center for Global Health, School of Public Health, Nanjing Medical University, Nanjing, China
School of Public Health and Social Work, Queensland University of Technology, Brisbane, Australia

Erzhen Chen*
Department of Emergency, Ruijin Hospital, School of Medicine, Shanghai Jiaotong University, Shanghai, China

Junhua Zheng*
Department of Urology, Shanghai Renji Hospital, School of Medicine, Shanghai Jiaotong University, Shanghai, China

Wei Wang*
Department of Cardiothoracic Surgery, Shanghai Children's Medical Center, School of Medicine, Shanghai Jiaotong University, Shanghai, China

*Corresponding authors.
E-mail addresses: chenerzhen@hotmail.com (E. Chen), zhengjh0471@sina.com (J. Zheng), wangwei@scmc.com.cn (W. Wang)
[1] Yong Yin, Jilei Lin, and Shuhua Yuan contributed equally to this study.